Claim Amendments

What is Claimed is:

1. (Currently amended) A computational component for performing a method, the method comprising:

receiving as part of a signal stream a desired signal path having symbols of a first length;

receiving as part of said signal stream an interfering signal path having symbols of a second length, wherein said second length is less than said first length; and

forming an interference matrix having at least three interference vectors, wherein a first of said interference vectors includes a representation of at least a portion of a first interfering symbol included in said interfering signal path, wherein a last of said interference vectors comprises a representation of at least a portion of a second symbol included in said interfering signal path, and wherein an intermediate one of said interference vectors comprises a representation of all of a third symbol included in said interfering signal path;

where the interference matrix is used to substantially reduce interference from the signal stream.

2. (Original) The method of Claim 1, wherein said interference vectors are time-aligned with one another.

3. (Original) The method of Claim 1, wherein said first length is an integer multiple of said second length.

4. (Original) The method of Claim 1, wherein said interference matrix comprises a plurality of intermediate interference vectors.

5. (Original) The method of Claim 1, wherein said interference vectors comprise a number of elements equal to a number of chips in said symbol of said first length.

6. (Currently amended) The method of Claim 1, wherein for a said second length ~~is~~ being equal to x elements, and ~~wherein~~ said first interference vector comprisinges y non-zero elements, ~~and wherein~~ said last column comprises x-y non-zero elements.

7. (Original) The method of Claim 1, wherein said symbol length is measured in chips, and wherein said intermediate interference vector comprises a number of non-zero elements equal to a number of chips in said symbols of said second length.

8. (Original) The method of Claim 1, wherein said symbol length is measured in chips, and wherein said interference matrix comprises a plurality of intermediate vectors, and wherein each of said intermediate vectors comprises a number of non-zero values equal to a number of chips in said symbols of said second length.

9. (Original) The method of Claim 1, wherein each of said interference vectors of said interference matrix comprises at least one zero value.

10. (Original) The method of Claim 1, wherein each of said interference vectors of said interference matrix comprises at least a number of zero values equal to said first length minus a number of chips comprising said second length.

11. (Original) The method of Claim 1, wherein said interference matrix is used in calculating a projection of a reference signal that is orthogonal to said interfering signal path.

12. (Original) The method of Claim 1, wherein said first, second, and third interfering symbols are associated with a first channel, and wherein said interference

matrix comprises at least a fourth interference vector comprising a representation of at least a portion of an interfering symbol associated with a second channel.

13. (Currently amended) The method of Claim 1, wherein said computational component ~~comprises a computer readable storage medium containing instructions for performing the method~~ is implemented in one of a mobile device or a wireless base station.

14. (Original) The method of Claim 1, wherein said computational component comprises a logic circuit.

15. (Currently amended) An interference matrix, comprising:

at least three interference vectors corresponding to at least three interfering symbols and having a number of elements equal to a number of elements in a desired symbol, wherein each of said at least three interference vectors includes zero values for a plurality of said elements and a non-zero value for at least a first element;

where the interference matrix is used to substantially reduce interference contributed by the said interfering symbols.

16. (Original) The interference matrix of Claim 15, wherein a sum of said elements having non-zero values in said at least three interference vectors is equal to a length of said symbol of interest.

17. (Original) The interference matrix of Claim 15, further comprising:

at least a fourth interference vector corresponding to a fourth interfering symbol and having a number of elements equal to said number of elements in said desired symbol.

18. (Original) The interference matrix of Claim 15, further comprising at least two interference vectors corresponding to at least fourth and fifth interfering symbols and having a number of elements equal to said number of elements in said desired symbol, wherein said at least two interference vector includes zero values for a plurality of said elements and a non-zero value for at least a first element.

19. (Currently Amended) A method for suppressing interference, comprising:

identifying an interfering signal;

tracking said interfering signal;

for at least a first channel included in said interfering signal, building an estimate of at least a portion of each symbol of said interfering signal that overlaps with a symbol of interest, wherein at least three symbols of ~~a~~ the first channel of said interfering signal at least partially overlap said signal of interest; and

forming an interference matrix comprising said estimate of at least a portion of each symbol of said interfering signal that overlaps with a symbol of interest;

where the interference matrix is used to substantially reduce interference contributed by the said interfering signal.

20. (Original) The method of Claim 19, further comprising:

forming a projection, wherein said at least a first channel included in said interfering signal is removed from a received signal to form an interference canceled despread signal stream.

21. (Original) The method of Claim 19, wherein said interference matrix comprises a plurality of vectors, said vectors each representing at least a portion of an interfering symbol.

22. (Original) The method of Claim 19, wherein said interference matrix comprises at least one vector for each of said symbols of said interfering signal that overlaps with said symbol of interest.

23. (Original) The method of Claim 22, further comprising:

forming a modified interference matrix, wherein at least one vector of said interference matrix is omitted.

24. (Currently amended) The method of Claim 22, wherein said interference matrix comprises a number of intermediate interference vectors, said method further comprising:

forming a modified interference matrix including a subset of said ~~first~~ number of intermediate interference vectors.

25. (Original) An apparatus for canceling an interfering channel from a signal path, comprising:

a first demodulation finger, wherein a first desired signal path is tracked;

a second demodulation finger, wherein a first interfering signal path is tracked; and

a cancellation controller, operable to form an interference matrix comprising at least a first interference vector, an intermediate interference vector, and a last interference vector, wherein said first and last interference vectors each correspond to a partial interfering symbol included in a first channel of said interfering signal path, wherein said intermediate interference vector contains a number of non-zero values corresponding to a complete interfering symbol included in said first channel of said interfering signal path.

26. (Currently amended) The apparatus of Claim 25, further comprising:

a orthogonal reference signal calculation module, wherein said interference matrix is combined with a reference signal that includes short code associated with said desired signal path and a Walsh covering code associated with a desired channel to create ~~an~~ the orthogonal reference signal.

27. (Original) The apparatus of Claim 25, further comprising:

a signal multiplier, wherein said orthogonal reference signal is combined with a received signal to produce a despread and decovered, interference canceled signal stream.

28. (Original) The apparatus of Claim 25, further comprising:

a summer, wherein said demodulated symbol of interest is obtained from said despread and decovered interference canceled signal stream.

29. (Original) An apparatus for a signal stream including suppression interference from a signal, comprising:

means for receiving a desired signal path and an interfering signal path;

means for detecting an active channel in said interfering signal path;

means for forming at least three interference vectors for each portion of a symbol in said interfering symbol path that overlaps with a desired signal; and

means for calculating a projection of a reference signal that is orthogonal to a matrix of vectors comprising said at least three interference vectors.

30. (Original) The apparatus of Claim 29, further comprising:

means for recovering a desired symbol from said received signal stream when combined with said orthogonal reference signal.

31. (Currently amended) A method for canceling interference, comprising:

receiving as part of a signal stream a desired signal path;

receiving as part of said signal stream an interfering signal path;

identifying at least a first active channel in said interfering signal path by:

1) obtaining a first number of chip values from said interfering signal stream, wherein said first number is equal to a number of chips included in a longest valid symbol;

2) performing a fast Walsh transform on said first number of chip values to obtain a first set of transformed values, wherein ~~said~~ a first result includes a first number of elements equal to said first number of chip values;

3) comparing a value of each of said first number of elements of said first set of transformed values to a threshold; and

4) creating a modified set of values, wherein for each element of said first set of transformed values:

a) in response to a first result of said comparison, a value of said element is changed to a zero;

b) in response to a second result of said comparison, a value of said element is not changed to zero;

forming an interference matrix comprising a plurality of interference vectors, wherein at least a first of said interference vectors comprises at least a portion of a first interfering symbol included in said identified at least a first channel of said interfering signal path and wherein a second of said interference vectors comprises at least a portion of a second symbol included in said at least a first channel of said interfering signal path;

where the interference matrix is used to substantially reduce interference from the signal stream.

32. (Original) The method of Claim 31, further comprising:

forming a projection operator, wherein a reference vector is projected onto a subspace orthogonal to the space spanned by said vectors of said interference matrix.

33. (Original) The method of Claim 32, wherein said forming a projection operator includes determining $\mathbf{P}_s^{\perp}$ where: $\mathbf{P}_s^{\perp} = \mathbf{I} - \mathbf{U}(\mathbf{U}^{\mathbf{T}}\mathbf{U})^{-1}\mathbf{U}^{\mathbf{T}}$, where $\mathbf{I}$ is the identity matrix and where the vectors of the interference matrix $\mathbf{U}$ form an orthogonal basis.

34. (Original) A method for canceling interference, comprising:

receiving as part of a signal stream a desired signal;

receiving as part of said signal stream an interfering signal path;

identifying at least a first active channel in said interfering signal path;

forming an interference matrix comprising a plurality of interference vectors, wherein at least a first of said interference vectors comprises at least a portion of a first interfering symbol included in said identified at least a first channel of said interfering signal path and wherein a second of said interference vectors comprises at least a portion of a second symbol included in said at least a first channel of said interfering signal path;

determining a projection operator $\mathbf{P}_s^{\perp}$ where: $\mathbf{P}_s^{\perp} = \mathbf{I} - \mathbf{U}(\mathbf{U}^T\mathbf{U})^{-1}\mathbf{U}^T$, where $\mathbf{I}$ is the identity matrix and where the vectors of the interference matrix $\mathbf{U}$ form an orthogonal basis; and

applying said projection operator to a reference signal.